MA 2310: Practice L'Hopital's Rule

1 Some non L'Hopital's Rule Review

1. $\lim_{x\to -1} \frac{1}{1+x}$
2. $\lim_{x\to -1} \frac{1}{1+x^2}$
3. $\lim_{x\to 0} \frac{1}{x^2}$
4. $\lim_{x\to 0} \frac{1}{x}$
5. $\lim_{x\to \infty} \frac{1}{\ln(x)}$
6. $\lim_{x\to \infty} \frac{1}{x}$
7. $\lim_{n\to \infty} \frac{n^2+2n+5}{3n^2+2}$
8. $\lim_{n\to \infty} \frac{n^3+2n+5}{3n^2+2}$
9. $\lim_{n\to \infty} \frac{n^2+2n+5}{3n^3+2}$

2 $\frac{0}{0}$ or $\frac{\infty}{\infty}$

10. $\lim_{x\to -1} \frac{1-x^2}{1+x}$
11. $\lim_{x\to 1} \frac{1-x^2}{1+x}$
12. $\lim_{x\to 0} \frac{\sin(2x)}{5x}$
13. $\lim_{x\to 0} \frac{1-\cos(2x)}{5x^2}$
14. $\lim_{n\to \infty} \frac{\ln(n)}{n}$
15. $\lim_{n\to \infty} \frac{n^2-n+2}{3n^2+2n+1}$
16. $\lim_{n\to \infty} \frac{n^2-n+2}{e^n}$
17. $\lim_{n\to \infty} \frac{e^n}{n^{10000}+1}$

3 $0 \cdot \infty$

18. $\lim_{x \to 1} (x-1) \frac{1}{e^x - e}$

19. $\lim_{n \to \infty} \frac{1}{n^2} \sin(\pi + \frac{1}{n})$

20. $\lim_{n \to \infty} n(1 - \frac{n}{n+1})^{1/2}$

4 $\infty - \infty$

21. $\lim_{x \to \infty} \sqrt{x+1} - \sqrt{x}$

22. $\lim_{x \to \infty} \sqrt{x^2 + x + 1} - \sqrt{x^2 - x - 1}$

23. $\lim_{x \to \infty} \ln(x+1) - \ln(x+2)$

5 0^0 or 1^∞ or ∞^0

24. $\lim_{x \to 0^+} x^x$

25. $\lim_{x \to 0^+} x^{\sin x}$

26. $\lim_{n \to \infty} (1+n)^{\frac{1}{n^2}}$

27. $\lim_{n \to \infty} (1+n^3)^{\frac{1}{n^2}}$

28. $\lim_{n \to \infty} (1+n)^{\frac{1}{\ln(n)}}$

29. $\lim_{n \to \infty} (1 + \frac{1}{n})^n$